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Assessment of Poor Drainage System in Building within Low Land Areas.

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Abstract.

Consequent upon poor drainage system urban environment in Nigeria are facing a lot of problems. The study is hinged on investigating the causes of drainage system and immediate causes of poor drainage system. Infrastructural and environmental problems caused by the drainage systems and measures of maintaining the associated problems in the area under study. Akure the capital of Ondo state in Nigeria is a fast growing city in terms of infrastructural development which involves concretizing and construction of the city land surfaces thus, leading to flooding. The finding reveals that the drainage system in some low land areas in Akure were not well designed due to low level of technical know-how, the disposal of debris into drainage have added adversely to the problem of flood in the study area; in Akure metropolis, flooding being observed to be the principal consequence of poor drainage systems. Also, the tested study revealed that poor drainage systems were actually the main cause of incessant flooding, destruction of environment infrastructural facilities, loss of lives and properties in the study area: Akure metropolis.

Keywords: Drainage, Low land, Floods, Residential, Impact

Introduction

Akure emerged as the capital of the Ondo state government as well as head quarters of the Akure local government authority in 1976. This development made the town assumed the status of a metropolitan city.

In spite of its many years of existence, the city has no physical development plan as different land –uses juxtapose each other in a reflection of its traditional setting before and during colonial administration. This has contributed in no small measure to rapid deteriorating environmental conditions in the city.

The rapid urbanization process in Akure has its own consequences such as overcrowded dwellings, high rate of pollution, inadequate household facilities and carefree attitude of people toward poor environmental conditions which have been the precondition for deteriorating environment (Owoeye and Adedeji,2013).cities in developing countries are particularly vulnerable to climate change impacts, especially changes in rainfall because of the exposure to extreme weather events. Excessive rainfall leads to flooding especially in areas with poor natural drainage systems, area where water and in areas where poor land use practices prevents drainages from channeling excess water away (Prekeyi,T. et al. 2015)

Literature

Nigeria cities have experienced tremendous physical development, in terms of reconstruction of roads, residential building, offices, stores and markets, manufacturing industries and others without any appreciable infrastructures such as drainages, roads and canals to support them and these have made floods to be a call for concern in the country (Aderogba, 2012)

Human activities such as dam construction, irrigation, bridges and others have negatively impacted on free flow of water in the drainage channels, rivers and streams, particularly at the urban centers construction of roads, buildings, factories, manufacturing plants, bridges and culverts, farmlands and others have reduced drainage channels and erosion passages and or diverted the natural courses of the flow of water (Aderogba, 2012).

Flooding although a common phenomenon all over the world is more rampant and distressing in the developing countries like Nigeria (Andjelkovic, 2001) According to Adeyinka et al (2008) most of these cities are also

characterized by uncontrolled development, sub standard and inadequate housing, poor infrastructure provision and development, poor planning process and administration, weak urban governance, poor land use structure resulting to slum.

Halley (2001) identifies the major cause of flood in Africa to be inadequacy of drainage. The heavy rainfall coupled with bad human activities in relation to the environment and lack of drainage infrastructure in most Nigeria cities have left hundreds of people distressed and homeless (Agbonkhese,O.et al,2014). Casual factors of flood in Nigeria which includes indiscriminate dumping of refuse on drainage channels to channel adjustment and poor drainage conditions have been observed by Agbonkhese,O. et al,(2013)

Odunuga et al (2012) also observed that flood occurs when there is overflow of urban drainages over the streets to the extent that it cannot be absorbed by earth surface and consequently results to property damage, traffic destruction and nuisance as well as health hazard.

Sule (2001) has given examples of cities in Nigeria where houses are constructed directly on drain channels to include Lagos, Calabar ,Akure and Ibadan and that this practice has resulted to blockage of storm drains and consequently leading to inundation and flooding of streets.

Urban flooding occur in towns located on flat or low lying terrain especially where little or no provision has been made for surface drainage , or where existing drainage has been blocked with municipal waste, refuse and eroded soil sediments.

Methodology

The materials used for data collection include mainly the questionnaire administration, direct observation, demographic and facility survey. This involves visitation of different low land areas in Akure metropolis such as Gaga quarters, Oke – Aro, Odiolowo, Isinkan and Odo Isolo. An investigation of the effect of poor drainage system is a major aspect of building construction which must be treated accurately by the professional body, government and individual living in the community.

This research is based on thirty six questionnaires out of the forty copies that were administered through convenient sampling technique within low land areas at Akure metropolis in Nigeria.

The method of analysis adopted to draw conclusion and recommendations are frequency, percentage, mean and descriptive method.

Table 1.1 below shows the causes of poor drainage system in building. Use of sub standard materials have the highest mean of 4.8 and was ranked as first most causes of poor drainage system, followed by low level of technical know –how to construct drainage system and inadequate of maintenance by the government and individual with mean score 3.8. Disposal of solid waste into the gutter by the individual was ranked third with mean 3.7. Poor funding from the contractor during the construction was ranked least by mean 3.1 which shows that they are not significant.

Table 1.1: **Causes of Poor Drainage System on building**

Causes	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Mean	Ranking
Poor funding from the Contractor during the construction	7	12	3	4	10	3.1	7th
Low level of technical know – how to construct drainage system	10	15	6	3	2	3.8	2nd
Lack of communication during the construction of the drainage system	6	16	10	1	3	3.6	4th
Use of sub-standard material for construction	19	17	1	4	0	4.8	1st
Poor monitoring and evaluation of site for construction	8	9	10	7	2	3.4	5th
The drainage systems are not wide enough in the study area.	13	7	10	2	3	3.6	4th
Government negligence	11	7	6	7	3	3.3	6th
Disposal of solid waste into the gutter by the individual l	14	9	3	8	3	3.7	3rd
Inadequate of maintenance by the government and individual	13	11	7	2	3	3.8	2nd

Source: Author's field of survey, June, 2018

Table 1.2: Effect of poor drainage system in building

Effect	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Mean	Ranking
It may lead to flooding of houses	22	13	1	0	0	4.6	1st
It improve excess of soil erosion	14	13	3	4	1	3.9	4th
Loss of foundation stability	9	10	9	3	5	3.4	7th
It can lead to distortion of aesthetic environment	10	17	6	3	1	4.0	3rd
It increase toxic material and disease organisms	13	14	6	0	4	4.0	3rd
It can lead to sitting of streams	8	10	12	6	1	3.6	6th
Destruction of infrastructural facilities such as road, gutter and houses.	15	15	4	1	1	4.2	2nd
It can lead to deposition of debris into the gutter	8	16	4	6	0	3.8	5th

Source: Author's field of survey, June, 2018

Table 1.2 indicates the effect of poor drainage system in building. The table shows that poor drainage system may lead to house flooding with highest mean of 4.6. Destruction of infrastructural facilities such as road, gutter and houses has the highest second mean of 4.2. Distortion of aesthetic environment and steady increase in toxic materials and diseases were ranked third with mean of 4.0 respectively. Loss of foundation stability was least with rank 3.4.

Table 1.3: Effectiveness of drainage system in building

Effectiveness	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Mean	Ranking
It helps to prevent the building and environment	21	9	1	3	2	1.6	8th
It help to reduce soil erosion	12	18	2	1	3	4.6	1st
It increase the stability of the foundation from collapse	10	10	9	5	2	3.6	5th
It help to prevent disease that can occur due to deposition of debris	10	15	7	1	2	3.8	3rd
It help to sustain the infrastructural facilities	9	11	4	8	5	3.4	6th
It help to reduce pollution and sedimentation of the adjourning stream	6	19	5	5	1	3..7	4th
It remove toxic materials	12	16	4	3	1	4.6	1st
It improve the aesthetic environment	8	10	8	5	5	3.3	7th
It help to reduce water accumulation	14	13	4	4	1	4.6	1st

Source: Author's field of survey, June, 2018

The above table 1.3, Indicates effectiveness of drainage system in a building. Removal of toxic materials, reduction in soil erosion and reduction of water accumulation has the highest mean of 4.6 respectively.

Prevention of disease that can occur due to deposition of debris was ranked third the mean of 3.8 while prevention of building and environment had the lowest mean of 1.6 with no significant.

Conclusion and Recommendation

Sequel to the data collection and analysis, it was observed that whenever there is development and urbanization, there is need for increase of infrastructure. Going by the rate of urbanization in the study area; especially in the area of housing, gutter, road construction and concretization of land surface which play a significant role in surface run off volume of water, drainage facilities of high quality should be provided to commensurate with the level of development in the study area, this will definitely ensure the sustainability of other infrastructure that could be damaged by flooding. Water will always find it own path if not channelized by man. Adequate drainage systems will divert excessive flow and reduce peak flow stages of flood.

The low-lying areas which can be submerged during heavy rains can adequately be coped with rather than being mitigated or controlled. However, studies could be focused toward flood control measures in low-lying areas. The media should also assist in educating the public on flood consequences. Drainage systems should often be monitored and inspected to take note of any defects in the systems with a view of effecting repairs. Vegetation plants whose roots are likely to damage the drainage system should be removed and dumping of refuses into the drainage systems should be guided against. For every individual, develop your plot with deep or wide drainage system. The environment remains our most valued legacy and possession which we must all strive to protect jealously.

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